UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,123	04/19/2004	Adi Ofer	EMC-024AUS	2298

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EXAMINER
PHAM, THOMAS K

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/827,123	OFER ET AL.
	Examiner	Art Unit	
	Thomas K. Pham	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>19 April 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-3,12,21 and 22</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1,2,12,21 and 22</u> is/are rejected.

7)☒ Claim(s) <u>3</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>19 April 2004</u> is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

First Action on the Merits

1.   Claims 1-3, 12, 21 and 22 of U.S. Application 10/827,123 filed on 4/19/2004 are

presented for examination.

Quotations of U.S. Code Title 35

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

3.   The claims and only the claims form the metes and bounds of the invention. "Office

personnel are to give claims their broadest reasonable interpretation in light of the supporting

disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir 1997).

Limitations appearing in the specification but not recited in the claim are not read into the claim.

In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ541, 550-551 (CCPA 1969)" (MPEP p2100-8, c

2, I 45-48; p 2100-9, c 1, I 1-4). The Examiner has full latitude to interpret each claim in the

broadest reasonable sense. The Examiner will reference prior art using terminology familiar to

one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or

implicit in meaning.

Drawings

4.   New corrected drawings in compliance with 37 CFR 1.121(d) are required in this

application because the drawings are informal. Applicant is advised to employ the services of a

competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no

longer prepares new drawings. The corrected drawings are required in reply to the Office action

to avoid abandonment of the application. The requirement for corrected drawings will not be

held in abeyance.

Information Disclosure Statement

5.   The information disclosure statement (IDS) submitted on 07/19/2004 is in compliance

with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being

considered by the examiner.

Double Patenting

6.   The nonstatutory double patenting rejection is based on a judicially created doctrine
grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or
improper timewise extension of the "right to exclude" granted by a patent and to prevent possible
harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed.
Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686
F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA
1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).
        A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to
overcome an actual or provisional rejection based on a nonstatutory double patenting ground
provided the conflicting application or patent is shown to be commonly owned with this
application. See 37 CFR 1.130(b).
        Effective January 1, 1994, a registered attorney or agent of record may sign a terminal
disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37
CFR 3.73(b).

Patent No. 6,754,897	Instant Application 10/827,123
1. A method of scheduling a requested operation comprising:	1. A method of scheduling operations for logical volumes in a data storage system comprising:
determining, for a plurality of priority classes, which operations associated with each of the priority classes in the plurality of priority classes have been requested;	determining, for a plurality of priority classes, which operations associated with each of the priority classes in the plurality of priority classes have been requested for a logical volume; and
selecting one of the operations by performing a probability-based operations lookup based on the determination;	selecting one of the operations by performing a probability-based operations lookup based on the determination.
wherein determining comprises: associating bitmaps with the priority classes, the bitmaps having bits corresponding to available operation types within the priority classes with which the bitmaps are associated; setting the corresponding bits for requested ones of the available operation types in one or more of the bitmaps to produce corresponding class_mask bitmap values; and producing an operation_classes bitmap value from the class_mask bitmap values, the operation_classes bitmap value having a bit for each of the priority classes and set bits for any of the priority classes for which ones of the available operation types were requested.	
9. An apparatus for scheduling a requested operation, comprising:	12. An apparatus for scheduling operations for logical volumes in a data storage system, comprising:
determining, for a plurality of priority classes, which operations associated with each of the priority classes in the plurality of priority classes have been requested;	a stored computer program in memory instituting the steps of determining, for a plurality of priority classes, which operations associated with each of the priority classes in the plurality of priority classes have been requested for a logical volume; and
selecting one of the operations by performing a probability-based operations lookup based on the determination;	selecting one of the operations by performing a probability-based operations lookup based on the determination.
wherein the instituted step of determining comprises: associating bitmaps with the	

priority classes, the bitmaps having bits corresponding to available operation types within the priority classes with which the bitmaps are associated; setting the corresponding bits for requested ones of the available operation types in one or more of the bitmaps to produce corresponding class_mask bitmap values; and producing an operation_classes bitmap value from the class_mask bitmap values, the operation_classes bitmap value having a bit for each of the priority classes and set bits for any of the priority classes for which ones of the available operation types were requested.	

7.   A question of patentability is raised with respect to representative claim 11 of the instant application under the judicially created doctrine of "obviousness-type" double patenting with respect to claims 1 and 9 of U.S. Patent No. 6,754,897 (see table above).

It should be noted that Patent 6,754,897 as a whole relates to scheduling of operations requesting data to be stored in logical volumes of a data storage system (e.g. Background of the Invention, column 3 lines 44-48, or column 5 line 3 to column 6 line 41 in the specification of Patent # 6,754,897). Thus, "a method of scheduling a requested operation" as claimed in claim 1 of Patent # 6,754,897 in view of the specification is no different from "a method of scheduling operations for logical volumes in a data storage system" as claimed in claim 1 of the instant application. Therefore, at least claims 1 and 9 of Patent # 6,754,897 contain every element of claims 1 and 12, respectively, of the instant application and as such anticipate(s) claims 1 and 12 of the instant application.

"A later patent claim is not patentably distinct from an earlier patent claim if the later claim is obvious over, or **anticipated by**, the earlier claim. In re Longi, 759 F.2d at 896, 225

USPQ at 651 (affirming a holding of obviousness-type double patenting because the claims at

issue were obvious over claims in four prior art patents); In re Berg, 140 F.3d at 1437, 46

USPQ2d at 1233 (Fed. Cir. 1998) (affirming a holding of obviousness-type double patenting

where a patent application claim to a genus is anticipated by a patent claim to a species within

that genus). " ELI LILLY AND COMPANY v BARR LABORATORIES, INC., United States

Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC

(DECIDED: May 30, 2001).

Claim Rejections - 35 USC § 103

8.   Claims 1-3, 12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over

U.S. Patent no. 5,381,546 ("Servi") in view of U.S. Patent no. 6,145,028 ("Shank").

Regarding claim 1

Servi teaches a method of scheduling jobs operations for a processor (e.g. col. 1 lines 54-65)

comprising: determining, for a plurality of priority classes, which operations associated with

each of the priority classes in the plurality of priority classes have been requested (e.g. col. 5

lines 42-53, scheduling of the tasks in association with the priority of each task); selecting one of

the operations by performing a probability-based operations lookup based on the determination

(e.g. col. 6 in particularly lines 11-40).

Servi does not teach the operations are for logical volumes in a data storage system.

However, Shank teaches a method of load balancing operations for logical volumes in a

data storage system (e.g. col. 1 lines 27-36, and col. 4 lines 53-66).

Servi and Shank are analogous art because they are in the same field of endeavor of allocating and balancing of loads or services.

The claim would have been obvious is that the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute the jobs request for a processor of Servi with operations request to store data on a data storage system of Shank because the result would be predictable by one ordinary skill in the art.

Regarding claim 12

Servi teaches an apparatus of scheduling jobs operations for a processor (e.g. col. 1 lines 54-65), comprising: a stored computer program in memory instituting the steps of determining, for a plurality of priority classes, which operations associated with each of the priority classes in the plurality of priority classes have been requested (e.g. col. 5 lines 42-53, scheduling of the tasks in association with the priority of each task); and selecting one of the operations by performing a probability-based operations lookup based on the determination (e.g. col. 6 in particularly lines 11-40).

Servi does not teach the operations are for logical volumes in a data storage system.

However, Shank teaches a method of load balancing operations for logical volumes in a data storage system (e.g. col. 1 lines 27-36, and col. 4 lines 53-66).

Servi and Shank are analogous art because they are in the same field of endeavor of allocating and balancing of loads or services.

The claim would have been obvious is that the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute the jobs request for a processor of Servi with operations request to store data on a data storage system of Shank because the result would be predictable by one ordinary skill in the art.

Regarding claim 21

Servi teaches a controller to control scheduling jobs operations for a processor (e.g. col. 1 lines 54-65); and wherein the controller is operable to determine, for a plurality of priority classes, which operations associated with each of the priority classes in the plurality of priority classes are pending (e.g. col. 5 lines 42-53, scheduling of the tasks in association with the priority of each task) and select one of the operations by performing a probability-based operations lookup based on the determination (e.g. col. 6 in particularly lines 11-40).

Servi does not teach the operations are for logical volumes in a data storage system of one or more storage devices.

However, Shank teaches a method of load balancing operations for logical volumes in a data storage system of one or more storage devices; (e.g. col. 1 lines 27-36, and col. 4 lines 53-66).

Servi and Shank are analogous art because they are in the same field of endeavor of allocating and balancing of loads or services.

The claim would have been obvious is that the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the

invention. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute the jobs request for a processor of Servi with operations request to store data on a data storage system of Shank because the result would be predictable by one ordinary skill in the art.

Regarding claim 22

Servi teaches a method of scheduling jobs operations for a processor (e.g. col. 1 lines 54-65) comprising: determining which requested operations are associated with each of a plurality of priority classes (e.g. col. 5 lines 42-53, scheduling of the tasks in association with the priority of each task); selecting one of the plurality of priority classes by performing a first probability-based lookup (e.g. col. 6 in particularly lines 11-40); and selecting one of the requested operations for scheduling by performing a second probability-based lookup, wherein the selected operation is associated with the selected priority class (e.g. col. 7 lines 6-21).

Servi does not teach the operations are for logical volumes in a data storage system of one or more storage devices.

However, Shank teaches a method of load balancing operations for logical volumes in a data storage system of one or more storage devices; (e.g. col. 1 lines 27-36, and col. 4 lines 53-66).

Servi and Shank are analogous art because they are in the same field of endeavor of allocating and balancing of loads or services.

The claim would have been obvious is that the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention. It would have been obvious to one of ordinary skill in the art at the time of the

invention was made to substitute the jobs request for a processor of Servi with operations request

to store data on a data storage system of Shank because the result would be predictable by one

ordinary skill in the art.

Regarding claim 2

Servi teaches the probability-based operations lookup comprises using a table of entries

corresponding to different operations, further comprising: forming a plurality of first selection

values, one corresponding to each of the priority classes in the plurality of priority classes (e.g.

col. 3 line 60 to col. 4 line 18); selecting one of the priority classes in the plurality of priority

classes (e.g. col. 5 line54-68); and selecting a corresponding one of the plurality of first selection

values corresponding to the selected one of the plurality of priority classes as a lookup index

pointing to one of the entries (e.g. col. 4 lines 19-46).

Allowable Subject Matter

9.   Claim 3 is objected to as being dependent upon a rejected base claim, but would be

allowable if rewritten in independent form including all of the limitations of the base claim and

any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner *Thomas Pham*, whose telephone number is (571) 272-3689, Monday - Friday from 7:30 AM - 4:00 PM EST or contact Supervisor *Mr. David Vincent* at (571) 272-3080.

Any response to this office action should be mailed to: **Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450.** Responses may also be faxed to the **official fax number (571) 273-8300.**

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas Pham
Primary Examiner

November 30, 2007